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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/936,122 | 09/06/2001 | Thomas Bieringer | MO-6585/LEA 33,633 | 9409 |
| 157 | 7590 | 10/08/2004 | EXAMINER | |
| BAYER MATERIAL SCIENCE LLC | | | ANGEBRANNDT, MARTIN J | |
| 100 BAYER ROAD | | | ART UNIT | |
| PITTSBURGH, PA 15205 | | | PAPER NUMBER | |
| | | | 1756 | |
| DATE MAILED: 10/08/2004 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/936,122

Applicant(s)

BIERINGER ET AL.

Examiner

Martin J Angebrannt

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 8/19/2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 23 and 24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 23 and 24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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1. The response provided by the applicant has been read and given careful consideration.

Rejection of the previous office action not repeated below are withdrawn based upon the amendments to the claims, specifically the thicknesses.

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 23 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims recites that the recording materials comprises a poly(meth)acrylate. It is not clear if this refers to the acrylate or methacrylate moiety of the dye or to the dye being copolymerized with an acrylate or methacrylate.

It seems that the specification describes the dye as part of the polymer and therefore the dye is in the polymerized form, not the monomer of formula II.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over **either** Bieringer et al. '846, in view of Savant et al. '221, Kawano et al. '890 and Colvin et al. '648.

Bieringer et al. '846 discloses azo monomers embraced by formula II in columns 4-6.

See the liquid crystalline monomers, which exhibit shape anisotropy in columns 6-7 . See also

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general formulae I and II. The recording of holographic images (gratings) is disclosed. (9/37-41) and the images are described as changing the refractive index (birefringence), which makes them volume images, rather than surface images (9/42-51). The formation of films of thicknesses of 0.1 and 1 mm is disclosed. (21-23). The use of copolymers is shown in polymers 4, 6-8, and 10-12 using azo monomer 7. The use of injection techniques is disclosed. (inflow). The copolymerization of the monomers containing photoactive side chains with other ethyleneically unsaturated monomers, such as acrylates and methacrylates is disclosed. (7/48-8/28).

Savant et al. '221 in example IV uses dye concentrations of 4.5 to 25% in polyvinyl alcohol. Examples V describes the azo dyes bound to a polyethylene vinyl alcohol backbone and coated to a thickness of 10 microns. Examples XIII to XX describe thicknesses of 10 to 150 microns (0.1 to 0.15 mm) with dye loading concentrations of 10% as the best (23/53-55). The storage of multiple holograms in the same spot by controlling the angle between the incident (object) and reference beams is disclosed. (25/46-57 and 7/11-15). Suitable polymers are disclosed in columns 8-10. Useful azo dyes are disclosed in columns 9-17. The formation of thicknesses of 10-1000 microns (1 mm) by spin coating is disclosed. (18/51-66). The images induces are based upon birefringence (26/6-23) The formation of 32 different patterns per spot is disclosed. (7/11-18)

Kawano et al. '890 teach azo used in holographic recording media to record polarization sensitive holograms. The use of thicknesses of at least 10 microns is disclosed. There is a preference that they be thicker to store more information, with 1 mm thicknesses able to store as much as 100 DVDs. (8/30-34).

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Colvin et al. '648 teach that as thickness increase so does the diffraction efficiency of the medium and the ability to store more holograms dues to facilitating bragg angle selection (angular multiplexing).

It would have been obvious to one skilled in the art to modify the examples of Bieringer et al. '846 cited by angularly multiplexing holograms during recording and reading them out to increase the amount of information recorded in the hologram, thereby increasing it's utility as taught by Savant et al. '221 and Colvin et al. '648 and to increase the thickness of the recording media to at least 1 mm as taught by Kawano et al. '890 and Colvin et al. '648 to increase their potential diffraction efficiency and their ability to angularly multiplexing holograms during recording and read out thereby increasing the amount of information recorded in the hologram and it's utility. Further it would have been obvious to use either angular multiplexing or polarization multiplexing to record several holograms in the same portion of the resultant medium.

The applicant argues that Bieringer et al. '846 does not teach volume recording. This is incorrect as clearly the thickness of the medium is used, rather than merely the surface. The applicant correctly argues that multiplexing of holograms is not taught in Bieringer et al. '846, but the examiner does to base the rejection merely upon Bieringer et al. '846. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The examiner has relied upon Savant et al. '221, Kawano et al. '890 and Colvin et al. '648 to teach multiplexing and specifically Savant et al. '221 and Kawano

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et al. '890 to show that this is known for azo dye based holographic recording media. The entire idea of multiplexing is that the same portion of the recording medium may be used to store plural images, which do not interfere with or affect one another. (See Taylor below). Any description of the use of multiplexing to store plural holograms in the same spot, such as polarization or angular multiplexing, meets the limitations of "without unacceptably diminishing, completely damaging or entirely overwriting the holograms already recorded in said material".

6 Claim 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bieringer et al. '846, in view of Savant et al. '221, Kawano et al. '890 and Colvin et al. '648 and further in view of Ross '663.

Ross '663 teaches holographic recording media which are 1 cm thick in the examples

In addition to the basis provided above, the examiner cites Ross '663 to support the position that the use of thick holographic recording media (up to 1 cm thick) is old and well known in the art.

The examiner notes that the effects of thickness on the capacity of volume holographic recording media and the Ross '663 is a volume holographic recording medium and establishes useful thicknesses include 1 cm.

7 The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Taylor 251 describes various multiplexing techniques, including angular multiplexing with respect to figures 1 & 1a, spatial multiplexing with respect to figures 2 & 2a and hybrids of these with respect to figures 3 & 3a. Discussions of these are presented (1/32-2/19) As it clear from the discussion, serial recording incrementally reduces the available recording capacity,

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while parallel recording does not for photopolymerizable systems. For photochromic systems, this would not be an issue as areas where the fringes overlap may be recorded over. Significant erasure does not occur when multiplexing photochromic materials due to the angular/polarization sensitivity of the recording medium conferred by the orientation of the isomerizable elements.

8 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J Angebranndt whose telephone number is 571-272-1378.

The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Martin J Angebranndt
Primary Examiner
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10/05/2004